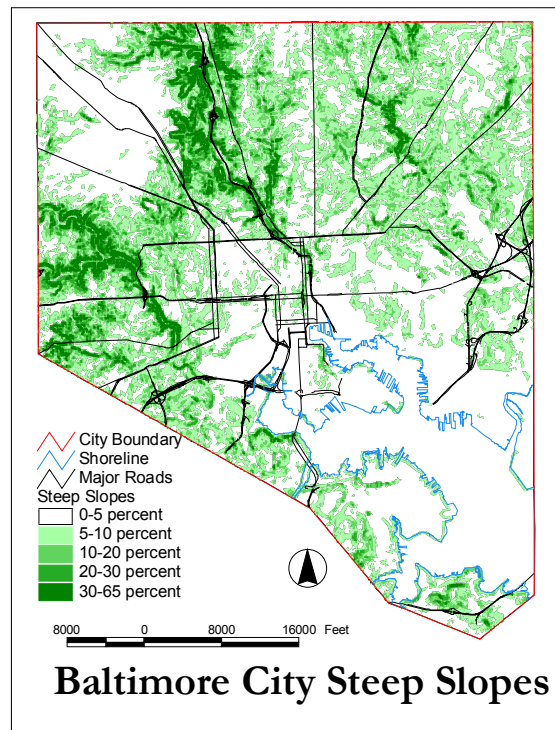
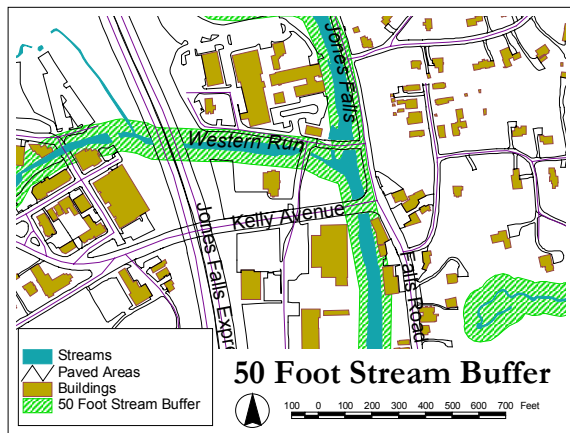


SENSITIVE AREAS PLAN FOR BALTIMORE CITY



Adopted June 12, 1997
Baltimore City Department of Planning
Kurt L. Schmoke, Mayor
Charles C. Graves III, Director

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PLAN REVIEW AND ADOPTION

This plan was reviewed by the City's Interagency Council on the Environment (consisting of Agency representatives from a dozen City agencies), by a group of City wide citizen leaders and interested environmentalists and by the Maryland Department of Planning.

The Baltimore City Planning Commission is responsible for plan adoption. This action by the Planning Commission constitutes adding the Sensitive Areas Plan to the City's Master Plan. The Baltimore City Charter authorizes the Planning Commission to review and approve the City's Master Plan. In this role, the Planning Commission will review the various topical plans produced and to ensure their mutual compatibility of their missions, goals, objectives and implementation recommendations.

The Sensitive Areas Plan begins the identification of natural areas and discussion of principles and concerns to be further explored in Baltimore's next Comprehensive Master Plan (expected completion date December 2000).

INTRODUCTION

In 1992, the State Legislature passed the Economic Growth, Resource Protection and Planning Act. This act requires that all local jurisdictions with planning and zoning authority amend their comprehensive plans to protect sensitive areas, adopt the Seven Visions of the act and streamline land use regulations for economic development.¹ The 1992 Planning Act requires that a Sensitive Areas Element be adopted by each jurisdiction by July 1, 1997.

The Seven Visions

The Seven Visions as stated in the 1992 Planning Act are as follows:

1. Development is concentrated in suitable areas;
2. Sensitive areas are protected;
3. In rural areas, growth is directed to existing population centers and resource areas are protected;
4. Stewardship of the Chesapeake Bay and the land is a universal ethic;
5. Conservation of resources, including a reduction in resource consumption, is practiced;
6. To assure the achievement of 1 through 5 above, economic growth is encouraged and regulatory mechanisms are streamlined; and
7. Funding mechanisms are addressed to achieve these visions.

What this Plan Addresses

This plan addresses the second vision that protects sensitive areas. The 1992 Planning Act

¹Sec. 3.05(a)(1)(viii), Sec.3.05 (b) and Sec.3.05 (a)(1)(vi), Article 66B, Annotated Code of Maryland.

defines sensitive areas as including: 1) streams and their buffers; 2) 100-year floodplains; 3) habitats of threatened and endangered species, and 4) steep slopes. Local jurisdictions are directed to include a sensitive areas element in their comprehensive plans that contains goals, objectives, principles, policies, and standards designed to protect sensitive areas from the adverse impacts of development.

Baltimore's Sensitive Areas Plan addresses these elements as well as the urban forest. The urban forest is comprised of the following: forested parkland; landscape trees in parks; forest on private lands; the tree canopy in residential neighborhoods and the 300,000 street trees maintained by the City. The urban forest is included in this plan because it is inextricably linked to the other sensitive areas and is an important natural element that provides a wide range of benefits and amenities to the urban area.

In the next chapter, sensitive areas are identified and discussed from the perspective of their functions in a highly urbanized area. Where possible, historical conditions of the areas are described and current conditions and locations are mapped. Each section explores the current values and benefits we ascribe to this natural resource. Finally, an overview of existing City regulations, policies and actions is presented.

The sensitive areas in this plan are described from preexisting data. This data was collected from City and State agencies and from a review of previous plans and studies that contained natural resource elements. Each resource is presented on citywide maps.

The final chapter identifies a mission statement, objectives and recommendations.

The City's next Comprehensive Master Plan will address the remaining visions from the 1992 Planning Act. The Planning Commission, which is about to embark on a two year effort to update the City's Comprehensive Master Plan, will incorporate the visions that are appropriate and applicable for Baltimore City, recognizing that Baltimore will benefit from the surrounding counties implementation of their plans.

SENSITIVE AREAS IN THE URBAN CONTEXT

Baltimore City's 87 square miles of land are more highly developed than any other jurisdiction in the state. According to Maryland Office of Planning 1985 land use data, approximately 15 percent of the City's area remains as vegetated open space. It is within this 15 percent that most of the City's sensitive areas are found.²

Baltimore City has a dense urban development pattern. As a result, the City's "sensitive areas" are substantially different in scale and type from that of suburban and rural counties. It can not be expected that its level of protection of sensitive areas will approach that of rural and more suburban areas. However, various attributes of sensitive areas are extremely important to maintain and enhance if Baltimore is going to increase its attractiveness as a place to live, work and play.

While there is limited land that remains relatively undisturbed, much of the ecological integrity of Baltimore has been altered. Many of our stream valleys are interlaced with sanitary sewer lines and storm drain outfalls. The City's floodplains are found in the highly urbanized areas of the central area of the City as well as in natural park areas. Baltimore's natural habitats and urban forest have been fragmented and altered as well. Most of Baltimore's forests are second growth forests and do not have the same ecological characteristics as less disturbed lands elsewhere in the state. Even most of the City's parkland is not a natural landscape. Parks consist of mowed fields, streets and sidewalks, buildings, playgrounds and tennis courts.

The various functions and activities of the city are closely interconnected to all these areas. There is a significant amount of public infrastructure occupying the City's sensitive areas. Sanitary sewers, conduits, sanitary pumping stations, water treatment facilities and storm drains are the types of infrastructure most commonly located in floodplains and stream valleys.

²Department of Planning, Habitat Assessment Study (Baltimore, 1989), p. 10.

As a result, there are competing public interests and conflicts in how we manage and regulate the public and private sensitive area lands in Baltimore. We must manage these lands for municipal purposes in addition to protecting their ecological and natural functions.

Baltimore is at a crossroads in terms of its development. No longer the sole economic engine of the State, we must look for new ways to continue the revitalization of the City. The Fairfield Ecological Industrial Park and the Gwynns Falls Greenway are two major examples of the recognition by the City of the need for a balance between urbanization and environmental restoration and improvement.

Many studies have demonstrated a strong link between a healthy economy and a healthy environment. A study conducted in 1995 by the Maryland Business Research Partnership, Maryland Business Climate Survey: Third Quarter, 1995, demonstrates that a high quality natural environment helps Maryland's ability to attract and keep businesses. Much of the economy of Maryland and Baltimore is dependent on a healthy environment. For example, many of the jobs related to recreational boating are largely dependent on a clean boating environment.³

In a 1994 study of development opportunities in Baltimore, 565 significant vacant and underutilized parcels were identified. Most of these properties were in or adjacent to established neighborhoods and represent a significant opportunity for accommodating a fair share of the regions projected growth. The great majority of these properties would not have an impact on sensitive areas if developed.⁴

Even in Baltimore, an area designated as a growth center, there are areas not suitable for development because of risk factors, such as flooding, or there are special attributes of areas that should be protected in order to make Baltimore an attractive and healthy place to live.

³Chesapeake Bay Foundation, A Dollars and Sense Partnership: Economic Development and Environmental Protection, (Chesapeake Bay Foundation, 1996), pg. 2.

⁴Planning Department, Vacant and Underutilized Properties (Baltimore, 1994) Executive Summary, pg. 1.

SENSITIVE AREAS

Streams and Their Buffers

Baltimore historically has been crossed by an intricate pattern of streams. In 1935, the Maryland Geological Survey produced a map purported to show the original drainage pattern in Baltimore City. The three major stream channels had many more perennial tributaries than exist today. Some of these tributaries drained smaller valleys while others found their origins in the many springs throughout the City. Other stream channels also existed that drained directly into the waters of the harbor. Many of the original springs and streams exist only in memory in the names of streets: Coldspring Lane, Greenspring Avenue, Brook Avenue and Clearspring Road.

Baltimore lies within two major drainage basins: the Patapsco River and the Back River basins. The Patapsco's two main tributaries are the Gwynns Falls, which drains the northwest and western portions of the City, and the Jones Falls, which drains the upper northwest and central portions of the city. The Herring Run drains the eastern part of the city, emptying into Back River in Baltimore County. Several remaining tributaries also feed these three major stream systems. Herring Run is fed by Chinguapin Run, two branches of Moore's Run and Armistead Creek. Stoney Run and Western Run feed the waters of the Jones Falls. The Gwynns Falls, before emptying into the Middle Branch, is fed by Maiden's Choice and Dead Run.

Most of what used to be tributaries have either dried due to urbanization, been graded over with fill for streets and buildings or have been channelized. The remaining major streams and tributaries have been impacted by urbanization with sedimentation, undercutting and erosion occurring throughout most segments. Erratic sedimentation and erosion occurs throughout the City as the hydrologic system seeks a new equilibrium. Only limited sections of waterways that pass through highly resistant rock have weathered the stresses of urbanization without these impacts.

All of Baltimore's streams have suffered from a variety of problems. The increase in impervious surfaces associated with buildings and pavement has had a variety of impacts on Baltimore's

waterways. During rainstorms water flows into streams with greater velocity and volume causing erosion, undercutting stream beds and disturbing plant and animal life. Higher water temperatures and a variety of pollutants from non-point run-off have also contributed to the degradation of Baltimore's streams. Stream systems and their channels are not static. The natural meander pattern of streams is disrupted by the hydraulic influences of bridges and bridge abutments.

Baltimore's stream valleys have served as the location for sanitary sewer interceptor lines - the 24 to 36 inch diameter pipes that carry the majority of the flow to the Back River and Patapsco sewage treatment plants. As a result of the erosion and undercutting of streams by storm flows, sewer lines have been exposed and subject to damage and leaks, further adding to the water quality problems in streams. A wide variety of land uses can be found within Baltimore's stream buffer areas. Industrialists originally located mills adjacent to streams to tap the flowing water as a power source. Today, a significant amount of this buffer land is still privately owned and zoned for industrial use.

Despite this loss of smaller stream systems, Baltimore recognized the opportunities and benefits of preserving the larger stream systems. During the late 19th century, as the rate of suburbanization increased, the City began acquiring land to be set aside for parks. Much of the City Park system was developed based on the 1904 Olmsted Brothers report Development of Public Grounds for Greater Baltimore. The report studied development patterns and the natural features of the City and identified key parcels for existing park expansion and the creation of stream valley parks. The report was updated in 1926 and in 1941. To a great extent, the 1904 plan was implemented and the stream valleys remain the foundation of the City's extensive park system.⁵

Streams and their buffers provide a multitude of benefits. The vegetated buffers of the streams help reduce nitrogen, phosphorus, sediments and other runoff pollutants. Buffers are especially important in an urban area because the trees and vegetation anchor the stream banks and slow the rate of erosion. Wetlands and vegetated buffers can also slow the energy and flow of water during floods.

⁵Department of Recreation and Parks, Land Preservation and Recreation Plan (Baltimore 1993), pg. 10.

The natural areas preserved as parks, while generally disturbed sites, have a unique quality in a highly urban environment. Aside from their recreation benefits, the parks and natural lands act to moderate climatic conditions. The trees, fields and natural stream valleys offer an aesthetic alternative to a continuous landscape of roads and buildings. These lands also provide habitat for many species of animals and plants including migratory woodland birds and waterfowl.

Existing Policies, Regulations and Actions

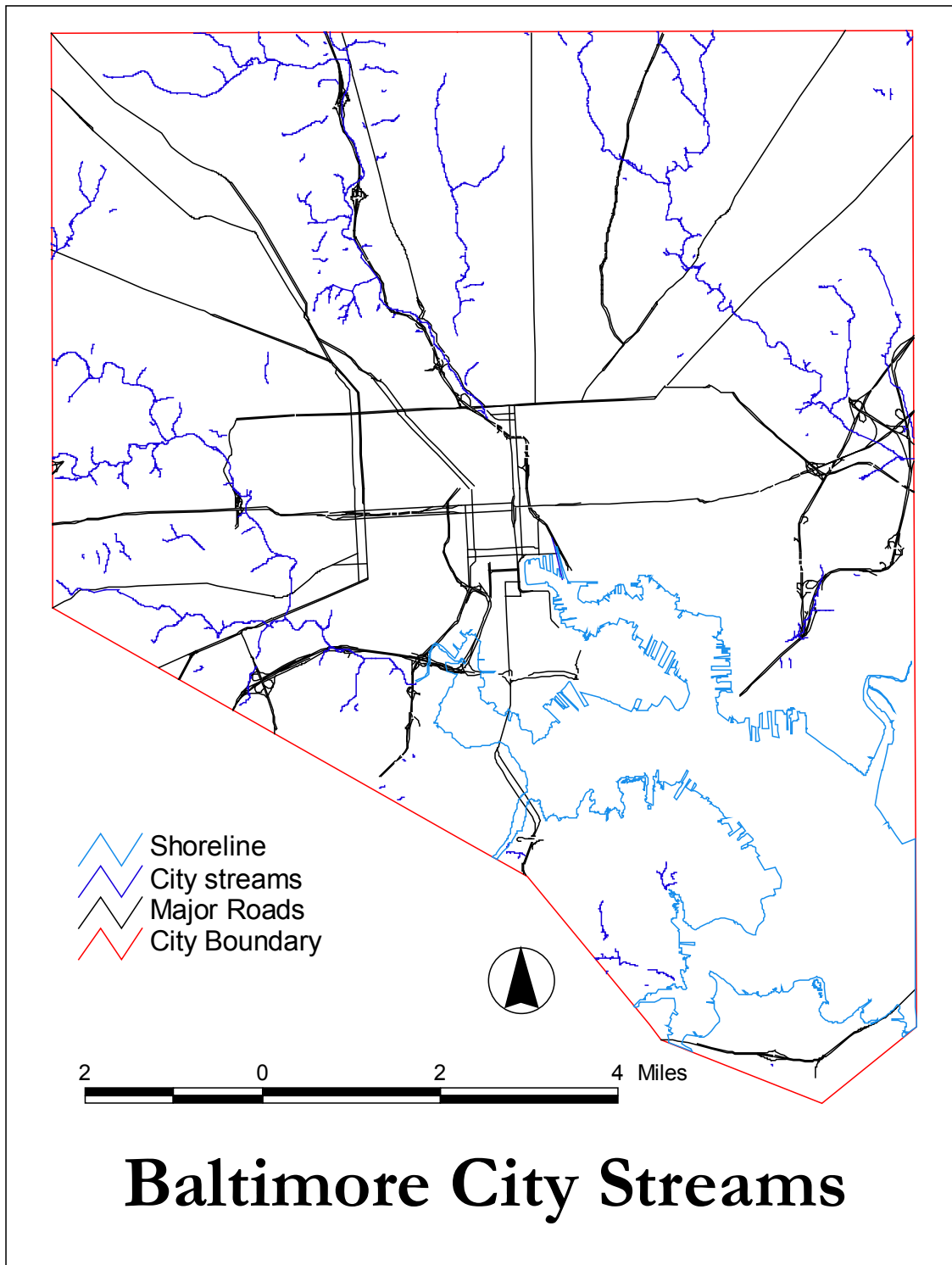
Baltimore's Floodplain Regulations require a 25-foot flood protection setback from the bank of mapped and unmapped streams. Any alteration of a watercourse is prohibited except by variance and to prevent erosion, natural vegetation must be maintained in the 25-foot setback. The regulations further specifies that planting of trees in this zone be given the highest priority.⁶

The Department of Recreation and Parks, in the 1991 Strategic Plan for Action, developed several new policies with regards to streams and their buffers. The plan recommended the development of no-mow zones, areas that would be allowed to naturally regenerate to create a vegetated area adjacent to streams. The plan also recommended reforestation efforts along stream valleys.⁷

⁶Article 7 - Floodplain Management, Baltimore City Code.

⁷Department of Recreation and Parks, Strategic Plan for Action (Baltimore, 1991) pg. 33.

Figure 1



This map is for planning purposes only and is not intended to be used to interpret permit requirements

100-year Floodplains

Along streams and the City shoreline are floodplains whose dimensions vary depending on adjacent topography. Baltimore's original floodplains looked markedly different from those of today. Before development, trees and vegetation absorbed rainfall. Soils, plants, riverine wetlands and geographic features associated with rivers could be used to delineate the floodplain. These natural floodplain features have been disturbed by the cutting and filling of soil, excessive sedimentation, the straightening and armoring of streams and the removal of vegetation.

As development in the City occurred, impervious areas increased the volume and speed of water draining towards city streams. Storm drain systems were installed to quickly drain water from parking lots and streets. As urbanization increased, so typically did the size and speed of floods after major storms.

As flood damage occurred with greater magnitude and frequency, engineers and planners developed the concept of regulating development based on estimates of the 100-year floodplain. Over the years, there have been a number of studies conducted to delineate 100-year floodplains in Baltimore City. The most comprehensive study to date has been the "Flood Insurance Study" published on September 30, 1988 and sponsored by the Federal Emergency Management Agency (FEMA) and the City of Baltimore with additional technical support provided by the Maryland Department of Natural Resources. This study provides Baltimore the basis for regulating development in the 100-year floodplain.

This study used engineering analyses to develop estimates for storms of varying magnitudes and to delineate a regulatory floodway. Portions of Biddison Run, Gwynns Falls, Jones Falls, Gwynns Run, Maidens Choice Run, Moores Run, Stoney Run and Western Run where new development or flood damage was expected to occur were studied by these detailed methods.

The following streams were studied by approximate methods: Herring Run; West Branch Herring Run; Chinquapin Run; Dead Run; and portions of Stoney Run, Maidens Choice Run, Gwynns Falls and Gwynns Run. The approximate method was used to study those areas having low

development potential or minimal flood hazards. The study used historic flood watermarks, vegetation surveys and other storm records to delineate these flood zones.

The FEMA study also identified two areas in the City where flooding occurs without a direct link to a stream channel. The Camden and Carroll industrial areas are subject to sheet flooding. Water escaping from the Gwynns Falls through the CSX right-of-way serving Locust Point causes this flooding. The downtown areas located above the Jones Falls box culverts area also subject to sheet flooding.

A wide variety of land uses are found in Baltimore's 100-year riverine floodplain. Significant areas have been developed for many years - industrial areas along the Jones Falls' floodplain, and commercial areas along Gwynns Falls and Jones Falls. A recent inventory of Baltimore's riverine floodplain determined that there are 1314 properties in the floodplain. 1004 of these floodplain properties are developed while 310 are vacant land. 400 had structures that could potentially be damaged by a 100-year flood. The Jones Falls, Western Run and the lower Gwynns Falls contain the bulk of these potentially damaged structures.

Much of the floodplain works its way through the City Park system in areas such as Leakin/Gwynns Falls Park, Herring Run Park and Chinquapin Park.

Most of Baltimore's tidal floodplain has been bulkheaded for erosion protection and many low lying areas have been filled, in some cases above the tidal base flood elevation. Of the 52 miles of shoreline along the City's tidal waters, 83 percent of the shoreline lacks a natural buffer of vegetation. Virtually all of the natural estuarine floodplain has been disturbed within the last century and the majority of the habitat has been completely removed and replaced with bulkheads, riprap buildings and paved surfaces.

Floodplains, even though altered by human activity, still provide important natural functions. Floodplains provide area for floodwaters to dissipate their energy, reduce the amount of erosion to stream channels and provide flood storage.

Existing Policies, Regulations and Actions

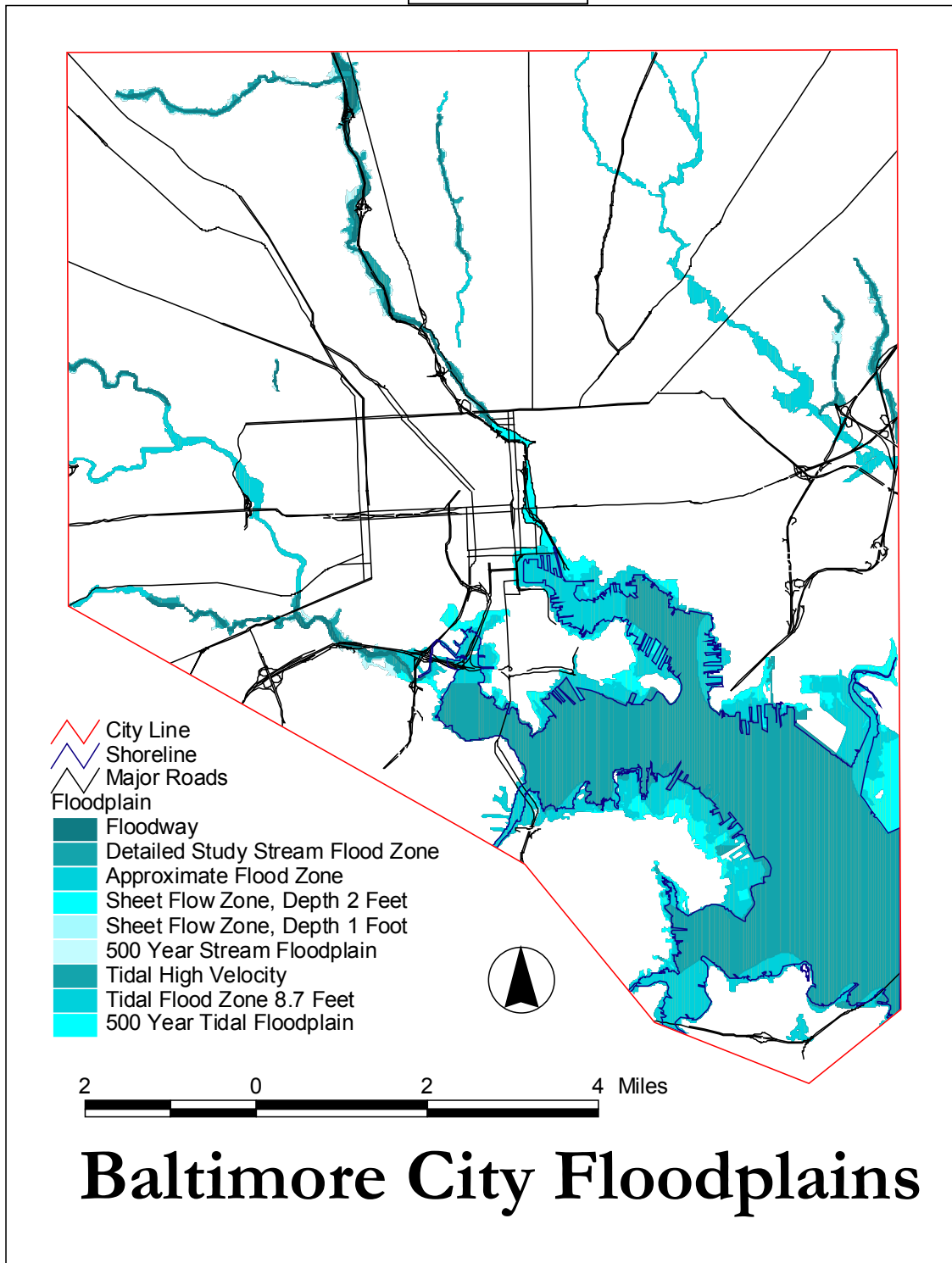
The City, with support from the State of Maryland, implemented a floodplain property acquisition program during the 1980's. This program, aimed primarily at residential properties, succeeded in removing over 100 residential properties from the floodplain. The City's floodplain management plan recommends updating this acquisition plan periodically. An acquisition program can protect against the loss of life and property in floodplains as well as enhancing natural uses of floodplains.

Baltimore has a floodplain management ordinance that regulates development within the 100-year floodplain. Although these regulations were primarily developed to protect life and property, they also serve to protect natural features during development. A 25-foot setback from the banks of all mapped and unmapped streams is required. The City's ordinance recommends that this setback be vegetated with trees. Altering the floodplain by filling over with 600 cubic yards per acre is prohibited except by variance. In stream sections that have delineated floodway, all private development including residential, commercial and industrial is prohibited in the floodway. Baltimore's Forest Conservation Act also recognizes forested floodplains as a high priority for preservation.⁸

Baltimore City and the U.S. Corp of Engineers are currently designing a flood dike for the Gwynns Falls. This dike will be situated parallel to Interstate-95 and will protect the Camden and Carroll industrial areas.

⁸Article 7A, Forest Conservation Act, Baltimore City Code.

Figure 2



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Habitats of Threatened and Endangered Species

As Baltimore developed and the amount of undisturbed natural lands was reduced, the amount and diversity of plants and animals have diminished. Loss of habitat, pollution and disturbance of soil has brought significant changes to the local flora and fauna. Animal habitat can be described as the combination of food, cover and water needed by an animal or plant. Plant habitat is the area that provides important elements for the growth and survival of the plant. These elements include soils, water chemistry and quantity and microclimatic factors. The animal species that remain in Baltimore are either well adapted to the urban environment or have retreated to some of the larger natural areas such as Leakin and Cylburn Parks.

In a 1989 Baltimore City Habitat Assessment study conducted by the Planning Department, it was estimated that there are over 20 species of mammals found in the City. Some species, such as foxes, raccoons, cottontail rabbit and squirrels can be found in great numbers because of their adaptability.

Baltimore City may have as many as twenty species of amphibians. Most amphibians are associated with streams and other wetlands or moist woodland habitats. Several species of frogs, toads and salamanders make up this amphibian population. Reptiles, composed of various snake and turtle species, are also found in Baltimore. While snakes are found in a wide variety of habitats, turtles are found mostly in wetlands and moist woodlands.

Over 200 species of bird species can be found here at different seasons of the year. Some birds reside here throughout the year while other species reside here only during the breeding season or only during migratory periods during spring and fall. The approximate percentages of each of the above seasonal classifications according a 1989 DNR report are:

Year Round Residents	15%
Wintering Species	20%
Breeding Birds	30%
Migratory Species	50%

The Maryland Natural Heritage Program, a program of the Maryland Department of Natural Resources, is responsible for maintaining the list of Rare, Threatened, and Endangered Species of

Maryland. The purpose of this list is to inform the public of rare species, to provide an indication of their degree of rarity, to solicit additional information on the status and distribution of these species, and to promote an interest in their protection. This list of rare species is the result of 15 years of gathering data from numerous sources, such as herbaria and private collections, scientific literature, unpublished documents, reports from botanists and amateur naturalists, and from field work conducted by Natural Heritage Program ecologists.

One animal on this list, the Peregrine Falcon, has nested on the USFG tower with several successful fledglings during the 1980's and 1990's. Falcons have also nested on the Francis Scott Key Bridge but with less breeding success. Peregrine Falcons prey almost exclusively on birds. The two waterfowl, the Common Moorhen and the Hooded Merganser, are typically found in wetlands and protected coves. In Baltimore, these areas are likely to be man-made wetlands created to offset the impact of bridge, road or utility construction. The Hooded Merganser is occasionally seen during the winter months in Masonville Cove of the Fairfield peninsula and in the Middle Branch, also during winter months. Both of these areas are already recognized by the City Critical Area Management Plan (CAMP) as waterfowl staging areas and each area has habitat protection areas on the adjacent land.

The majority of the plants on Baltimore's Rare, Threatened, and Endangered Species List are herbaceous plants found in woodlands, woodland borders or old fields. Some of the grasses found on the list predominate in roadsides, railroad right-of-ways and disturbed fields. The Cylburn Arboretum, northern Druid Hill Park and the riparian zones of Gwynns Falls and Herring Run are considered the habitats where these plants are most likely found.

Existing Policies, Regulations and Actions

The City currently has no regulations specifically designed to protect habitats of threatened and endangered species. The Forest Conservation Act and the Critical Area Management Plan both contain provisions that require developers to analyze the impact of development on significant habitat.

CURRENT AND HISTORICAL RARE, THREATENED, AND ENDANGERED SPECIES
OF BALTIMORE CITY, MARYLAND*

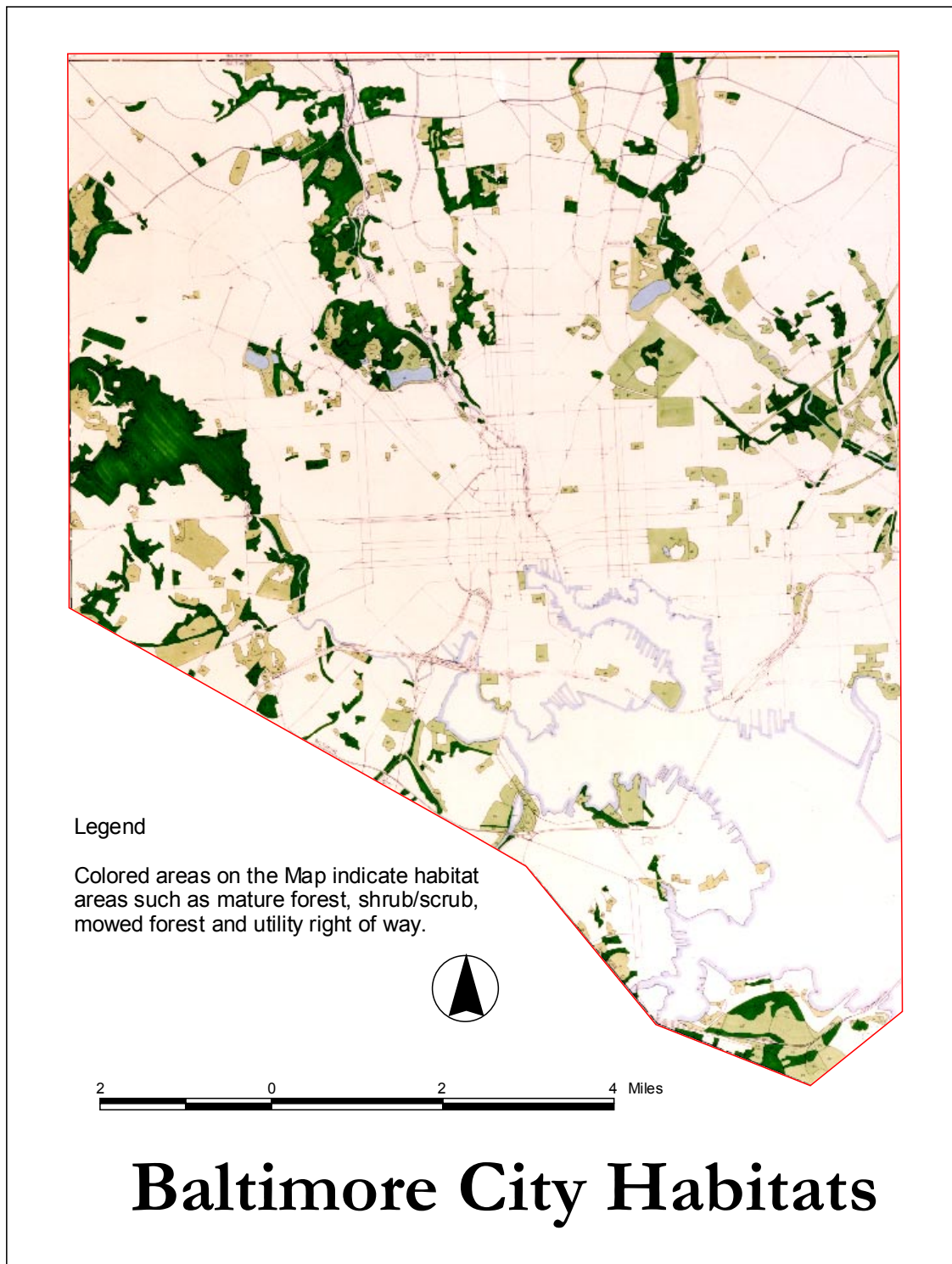
February 20, 1996

Maryland Natural Heritage Program, Department of Natural Resources

<u>Scientific Name</u>	<u>Common Name</u>	<u>Global Rank</u>	<u>State Rank</u>	<u>Federal Status</u>	<u>State Status</u>
<u>Animals</u>					
Falco peregrinus	Peregrine falcon	G4	SXSEB	LE	E
Gallinula chloropus	Common moorhen	G5	S2B		I
Lophodytes cucullatus	Hooded merganser	G5	S1B		
<u>Plants</u>					
Bromus latiglumis	Broad-glumed brome	G5	S1		E
Calopogon tuberosus	Grass-pink	G5	S1		E
Carex aggregata	Glomerate sedge	G5	SH		X
Carex hirtifolia	Pubescent sedge	G5	S1		E
Carex leavenworthii	Leavenworth's sedge	G5	SH		X
Carex mesochorea	Midland sedge	G4G5	S1		E
Coptis trifolia	Golthread	G5	S1		E
Desmodium laevigatum	Smooth tick-trefoil	G5	S1		E
Euphorbia purpurea	Darlington's spurge	G3	S1	C2	E
Gentiana villosa	Striped gentian	G4	S1		E
Parthenium integrifolium	American feverfew	G5	S1		E
Platanthera blephariglottis	White fringed orchid	G4G5	S2		T
Pycnanthemum pycnanthemoides	Southern mountain-mint	G5	SH		X
Quercus macrocarpa	Mossy-cup oak	G5	S1		
Ranunculus pensylvanicus	Bristly crowfoot	G5	S1		X
Solidago speciosa	Showy goldenrod	G5	S1		E
Stachys clingmanii	Clingman's hedge-nettle	G3	S1		E
Tofieldia racemosa	Coastal false ashodel	G5	SH		X

* This report represents a compilation of information in the Maryland Natural Heritage Program database as of the date on this report. It does not include species considered to be "watch list" or more common species.

Figure 3



This map is for planning purposes only and is not intended to be used to interpret permit requirements.

Steep Slopes

The City of Baltimore is located where the Piedmont Plateau and the Atlantic Coastal Plain meet. The juncture of these provinces is called the "fall line." This line roughly bisects the city in a direction from northeast to southwest. The "fall line" enters the City in the vicinity of Belair Road in northeast Baltimore, is found in the downtown area near Monument Street and leaves the southwest part of the City near Wilkens Avenue.

Baltimore's Atlantic Coastal Plain has few steep slopes and the land is characterized by gentle undulations. The Coastal Plain topography is relatively flat and consists of alluvial deposits of Baltimore's streams. This material is comprised of unconsolidated sand, clays and some gravel.

Extending northwest from the "fall line" is the Eastern Division of the Piedmont Plateau. This area is underlain with a complex series of metamorphic rocks, which results in highly diverse topography. In the Piedmont Plateau region, Baltimore's streams have incised a variety of steep valleys.

Baltimore's steep slopes are found mostly in these Piedmont portions of the major stream valleys of the Jones Falls, the Gwynns Falls and the Herring Run and their tributaries. For the most part, large tracks of undisturbed steep slopes are found within or adjacent to City-owned parkland. In the vicinity of the Jones Falls, the majority of privately owned lands with undeveloped steep slopes are in institutional or industrial uses such as Television Hill and the properties in the vicinity of Jones Falls and 41st Street. Many of the slopes in this area have been disturbed but have stabilized with the return of natural vegetation and trees. Along the Herring Run, in northeast Baltimore, steep slopes are most prevalent in the area between Belvedere Avenue and Lake Montebello. Much of this land is within the boundaries of Morgan State University and is undeveloped. Steep slopes are also found in the Belgravia section near Belair Road.

Various areas in the City not associated with major stream valley geography also have steep slopes. These include Ten Hills, Druid Hill Park and the Lake Ashburton area. In the coastal plain sections of South and East Baltimore, steep slopes are predominately the result of land

disturbance or landfill development. There are few steep slopes in this sector of the city, which lies in the coastal plain.

The Baltimore City Soil Survey Interim Report, published in 1990, provides data on a variety of soil characteristics including slope. A variety of soils were on steep slopes of 15% or greater covering about 5% of Baltimore City.⁹

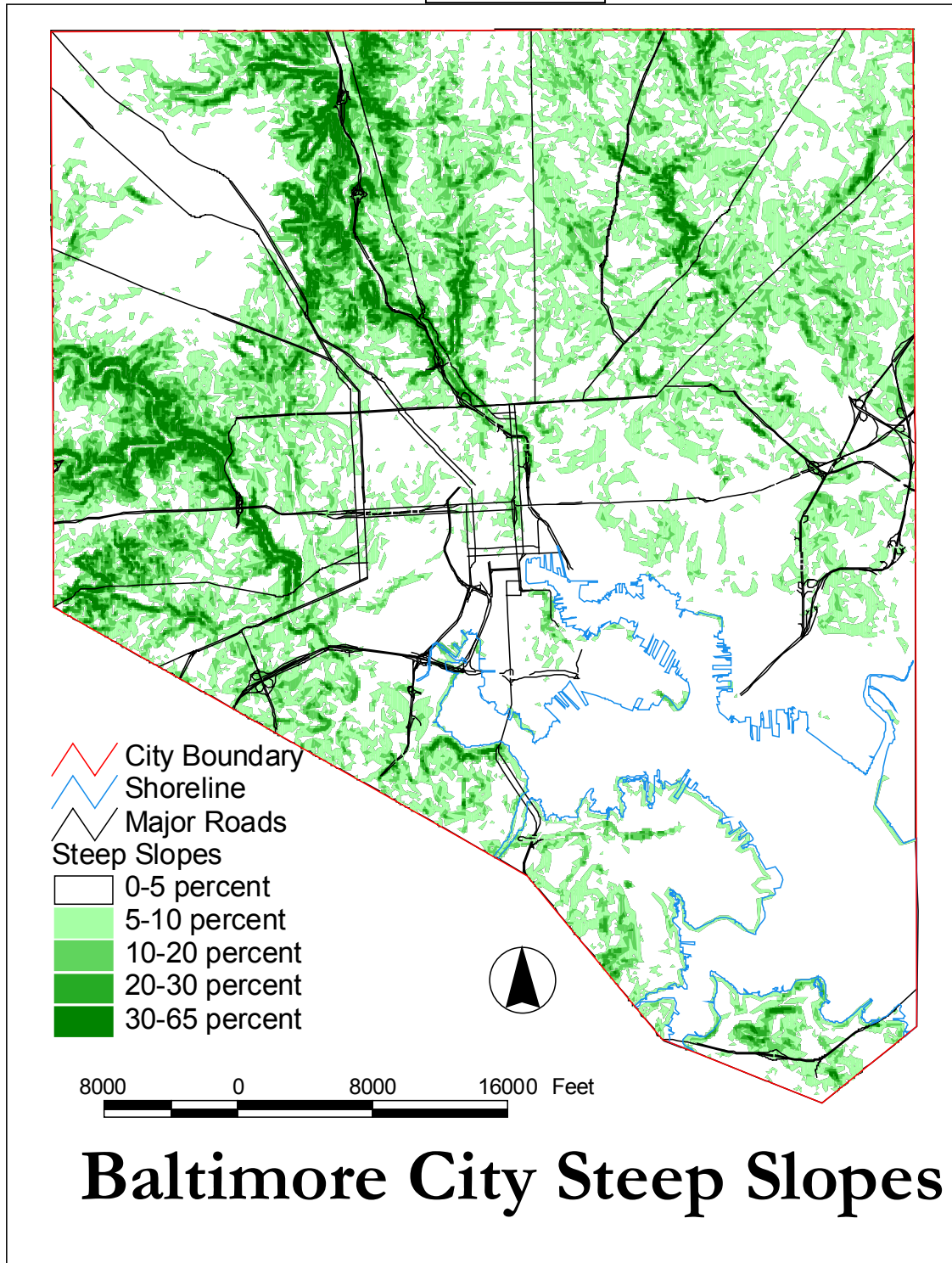
Insert Maryland Geological map of Steep Slopes

Existing Policies, Regulations and Actions

Baltimore City has no regulations addressing steep slopes directly. Both the Forest Conservation Act designates forested steep slopes as areas for priority protection. In Baltimore's Critical Area Management plan, the forested steep slope south of the Middle Branch has been designated a resource conservation area.

⁹United States Soil Conservation Service, Baltimore City Soil Survey Interim Report (Annapolis, 1990).

Figure 4



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Urban Forests

Most of Baltimore City was originally covered by forest. Researchers have described the original tree cover in this region as Eastern Oak-Hickory Forest. More specific descriptions of undisturbed portions of Leakin Park describe it as a mixed forest with three predominant associations: Oak Hickory, Beech-Birch, and Maple-Ash-Boxelder. Baltimore's original forest cover has long since been removed. Only an isolated section of Leakin Park may remain undisturbed. Since original tree cover was cleared, Tulip poplar associations have predominated.

Baltimore's urban forest is comprised of forested parkland, landscape trees in parks, forest on private lands, the tree canopy in residential neighborhoods and the 300,000 street trees maintained by the City.

A 1985 State Planning land use survey determined that six percent of the City's land was covered in forest areas of 10 acres or more. The survey indicated that the largest stands of forest were clustered around the major stream valleys of the Gwynns Falls, Jones Falls and Herring Run. Additional stands were scattered in various City parks.

According to the 1993 Maryland Department of Natural Resources (DNR) Comprehensive Forest Inventory, forests of one acre or more cover nine percent of the land in the City. This DNR inventory differentiates forest areas into deciduous, coniferous, mixed and shrub/scrub tree covers. The data have been broken down onto five sub-watersheds of Back River, Baltimore Harbor, Jones Falls, Gwynns Falls and Patapsco River.¹⁰

The Gwynns Falls sub-watershed had the highest percentage of forest cover (13.7%) and also had the highest percentage of deciduous forest. Leakin/Gwynns Falls Park, located on the Gwynns Falls sub-watershed, is the most important forested area in the City and accounts for the high percentage of deciduous forest in this sub-watershed.

¹⁰Maryland Department of Natural Resources, Baltimore County/Baltimore City Forest Cover (Salisbury, 1991) computer GIS format.

The Baltimore Harbor subwatershed, which is comprised of Hawkins Point, South Baltimore, portions of downtown Baltimore and southeast Baltimore, has the highest percentage of coniferous forest. This is accounted for by the large stands of pines in the Hawkins Point area.

In addition to these larger stands of trees, many neighborhoods have extensive tree cover on individual lots. Although not constituting a true forest in that there are homes and streets, trees in many residential neighborhoods can form an almost continuous canopy.

Street trees make up the final component of the urban forest. The Forestry Division of the Department of Recreation and Parks is responsible for maintaining the City's street trees. In a summary of forest operations from 1985 through 1996, Baltimore City staff removed 24,136 trees and planted 22,223 trees on our streets and in our parks.

Urban forests provide many important benefits to the City.

Water Quality Protection

- encourages infiltration of polluted runoff, preventing pollutants from reaching streams
- allows soils to naturally cleanse infiltrated runoff as pollutants bind to soil particles
- deep rooted trees absorb soluble pollutants (nitrogen and phosphorus) beneath the soil which may otherwise enter waterways

Air Purification

- remove carbon dioxide
- release oxygen
- remove pollution particles

Wildlife Habitat

- Supports some of the greatest number of birds, mammals, reptiles and amphibians of any habitat type

Climate Control

- temperatures in the forest tend to be lower than the surrounding air during the day

Runoff reduction

- helps rainfall to be absorbed into the soil, reducing surface runoff which can reduce urban flooding

- Increases organic material increasing the soils water absorbing capacity

Aesthetic

- maintains our link with the natural environment where the majority of the city environment is concrete
- softens and screens man-made urban elements
- adds dynamics to the hard edged and static urban landscape

In an Urban Ecological Analysis Report prepared for the National Urban and Community Forestry Advisory Council by Urban Forests, Baltimore's urban trees were explored to interpret their benefits. Aside from the well-known aesthetic contributions, trees in Baltimore were found to contribute financial values through three important ecological functions of trees.¹¹

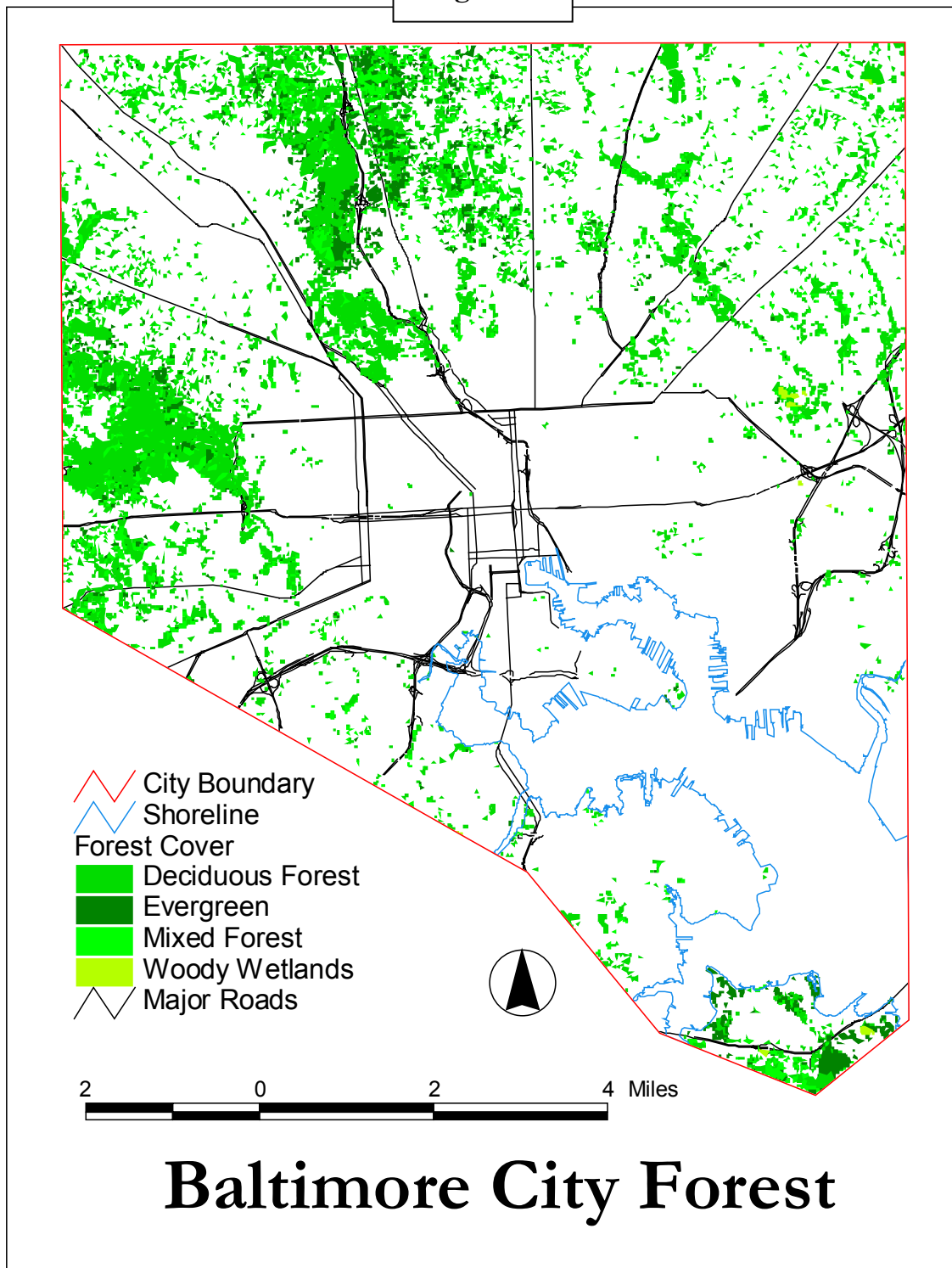
- 1) Trees and forests improve air quality through the reduction of airborne carbon.
- 2) The existing tree canopy cover reduces stormwater flows by up to 10%.
- 3) Trees provide direct shade to buildings and homes, which lowers cooling requirements.

Existing Policies, Regulations and Actions, Regulations and Actions

Baltimore's Forest Conservation Act regulates the removal of trees. The act is triggered by subdivision of lots greater 20,000 square feet or by any development on a single lot that disturbs more than 20,000 square feet. A minimum percentage of tree cover is required after development, depending upon the zoning, even for properties that had no trees before development. The act allows the required reforestation to take place off site in City Parks or as street tree plantings.

¹¹American Forests, Urban Ecological Analysis Report (Washington, D.C., 1996) pg. 14.

Figure 5



This map is for planning purposes only and is not intended to be used to interpret permit requirements.

GOALS, OBJECTIVES AND RECOMMENDATIONS

Goal Statement

- *Increase the attractiveness of Baltimore as a place to live, work and recreate by protecting sensitive areas from the adverse impacts of development and growth and by enhancing the quality of the natural environment.*

Objective #1

- *Continue existing policies and regulations in previously developed areas.*
The plan recognizes that there are areas in the City where Sensitive Areas have lost their primary purpose for protection - in these areas development should be regulated to mitigate or minimize impacts. These areas include downtown, commercial corridors and Brownfields or other previously developed properties.

Recommendation

- When sensitive areas have lost their primary purpose for protection, regulate development to mitigate or minimize impacts.
- Regulate land uses in developed floodplain areas. Critical facilities such as police, fire and public works should not be located in the floodplain. Hospital, medical facilities, day-care centers and schools should also be prohibited to prevent loss of life in the event of a flood.
- Update City storm water management regulations to reflect current available technology and resources.

Objective#2

- *Manage City lands to protect and enhance Sensitive Areas.*
Significant portions of the City's streams and their buffers, 100-year floodplains and natural habitats are found in City parks or other City owned land. The plan recommends that the City conduct its management and infrastructure repair work to protect and enhance Sensitive Areas. Where necessary, manage and regulate sensitive areas for multiple objectives.

Recommendations

- Develop and implement watershed management plans to guide public infrastructure planning. Manage City lands for the multiple objectives of utility, infrastructure and open space needs.
- Existing development regulations should be reviewed to allow development greater flexibility in avoiding impacts on sensitive areas, and where avoidance is not possible, to minimize impacts.

Recommendations Continued

- City infrastructure activities should incorporate sensitive area protection and enhancement goals. Public activities within sensitive areas should be designed to 1) avoid, 2) mitigate, or 3) enhance sensitive areas when avoidance is not possible.

Objective#3

- *Plan for multiple objectives in areas of high risk or where special features exist.*
Areas that are not suitable for development because of risk factors, such as severe flooding, should be considered for other City goals. This can support other objectives such as greenway development. Develop linkages with Federal and State agencies and non-governmental organizations.
- Continue greenway and recreational trail development as appropriate use of sensitive areas.
- Update City's floodplain acquisition plan to support other management goals such as the establishment of greenways and a recreational trail system.

Objective#4

- *Continue environmental analysis during Comprehensive Master Plan.*
More detailed inventories of natural features, especially steep slopes, should be part of the comprehensive master planning process.

Recommendations

- Conduct an inventory of steep slopes and develop policies for protection if necessary
- Develop a natural resource inventory of the City and integrate this database with State inventories.

Objective#5

- *Continue cooperative efforts with other levels of government and non-profits.*
Finally, the plan recommends that the City continue its cooperative efforts to protect and enhance Sensitive Areas with State and Federal Agencies and with local and State non-profit organizations.

Recommendations

- Support and encourage citizen-based organizations that are involved in park cleanups, water monitoring and tree planting.

Recommendations Continued

- Enhance the City's ability to increase the urban forest through planting more street trees and trees in Parks
- Develop a strategic plan for increasing the urban forest including street trees, trees on private lands and trees in City parks.
- Environmental planning must be coordinated closely with metropolitan counties, State and Federal Agencies.

ACKNOWLEDGEMENTS

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